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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,061	01/05/2005	Wataru Matsumoto	2611-0229PUS1	5128
2292	7590	10/19/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			RIZK, SAMIR WADIE	
			ART UNIT	PAPER NUMBER
			2133	

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/520,061		MATSUMOTO, WATARU	
	Examiner		Art Unit	
	Sam Rizk		2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/5/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTIONS

- Claims 1-13 have been submitted for examination
- Claims 1-13 have been rejected
-

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1 and 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 copending **Application No. 10/482815**. Although the conflicting claims are not identical they are not patentably distinct from each other because the claims of the instant application anticipate the claims of **application 10/482815**.

"A Later patent claim is not patentably distinct from an earlier patent claim if the Later claim is obvious over, or anticipated by, the earlier claim. *In re Longi*, 759

F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior ad patents), In re Bern, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (Affirming a holding of obviousness- type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

Examiner notes the claims citation of the copending **Application No. 10/482815** and this application are almost the same.

The copending application teaches every limitation in claims 1 and 13 of the application under examination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

2. Claims 7-12 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 copending **Application No. 10/482815**. Although the conflicting claims are not identical they are not patentably distinct from each other because the claims of the instant application anticipate the claims of **application 10/482815**.

"A Later patent claim is not patentably distinct from an earlier patent claim if the Later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double

patenting because the claims at issue were obvious over claims in four prior ad patents), In re Bern, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (Affirming a holding of obviousness- type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

Examiner notes the claims citation of the copending **Application No. 10/482815** and this application are almost the same.

The copending application teaches every limitation in claims 1 and 13 of the application under examination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

3. Claims 1 and 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 copending **Application No. 10/518444**. Although the conflicting claims are not identical they are not patentably distinct from each other because the claims of the instant application anticipate the claims of **application 10/518444**.

"A Later patent claim is not patentably distinct from an earlier patent claim if the Later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness-type double

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patenting because the claims at issue were obvious over claims in four prior ad patents), In re Bern, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (Affirming a holding of obviousness- type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

Examiner notes the claims citation of the copending Application No. 10/482815 and this application are almost the same.

The copending application teaches every limitation in claims 1 and 13 of the application under examination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. Claims 7-12 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 10 copending **Application No. 10/518444**. Although the conflicting claims are not identical they are not patentably distinct from each other because the claims of the instant application anticipate the claims of **application 10/518444**.

"A Later patent claim is not patentably distinct from an earlier patent claim if the Later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior ad

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patents), In re Bern, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (Affirming a holding of obviousness- type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

Examiner notes the claims citation of the copending Application No. 10/482815 and this application are almost the same.

The copending application teaches every limitation in claims 1 and 13 of the application under examination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Drawings

5. Figures 16-18 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. Claims 1,2 and 7-13 are objected to because of the following informalities:

The quotation marks should not be in the claim language.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 1 recites the limitation "**the optimal ensemble**" in line 22. There is insufficient antecedent basis for this limitation in the claim.
8. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - The method according to claim 1, wherein a basic matrix is generated based on an integer lattice structure that satisfies conditions that "weights of rows and columns are constant" and "**minimum number of cycles is eight**" as the basic matrix that satisfies the conditions that "weights of rows and columns are constant" and "**number of cycles is equal to or more than six**".
Examiner believes the condition "**minimum number of cycles is eight**" is contradicting with the other condition cited that the "**number of cycles is equal to or more than six**".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Souza et al. US patent no. 6789227 B2 (Hereinafter De Souza) as applied to claims 1-13 above, and further in view of Applicant Admitted Prior Art (Hereinafter AAPA)

9. In regard to claim1, DE Souza teaches;

- A method of generating a check matrix for a low-density parity-check code in which at least one of weights of a column and a row is not uniform, the method comprising:

(Note: De Souza, Abstract)

- Determining a coding rate;

(Note: De Souza, col.4, line 52)

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- Generating a basic matrix that satisfies conditions that "weights of rows and columns are constant" and "number of cycles is equal to or more than six"

(Note: De Souza, col. 4, lines (60-67)).

- Determining number of columns and number of rows of the check matrix to be finally obtained,

(Note: De Souza, col. 5, lines (1-10)).

- Substituting rows of the basic matrix created, based on a specific relational equation,

(Note: De Souza, col. 5, lines (10-13)).

However, De Souza does not explicitly teach;

- Searching provisionally an ensemble of row weights and column weights of the low-density parity check code by executing a Gaussian approximation based on a predetermined condition before a row deletion;
- Deleting rows of the basic matrix after the substituting in order from a bottom by considering the number of rows after a division, that is, the number of rows of the check matrix to be finally obtained;
- Searching an optimal ensemble of row weights and column weights of the low-density parity check code by executing the Gaussian approximation based on a predetermined condition after the row deletion, and

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- Dividing at random the row weights and the column weights of the basic matrix after the row deletion based on the optimal ensemble.

The Applicant admitted Prior Art (Note: specifications page 5, lines (6-24)) teaches analysis of sun-product decoding of low-density parity check codes using a Gaussian Approximation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify De Souza with the teaching of AAPA to include details of Gaussian approximation in the heuristic search algorithm.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need to minimize a signal-to-noise ratio.

10. In regard to claim 2, De Souza teaches;

- The method according to claim 1, wherein a basic matrix is generated based on an integer lattice structure that satisfies conditions that "weights of rows and columns are constant" and "minimum number of cycles is eight" as the basic matrix that satisfies the conditions that "weights of rows and columns are constant" and "number of cycles is equal to or more than six".

(Note: De Souza, Fig 6C, Col. 4, lines (60-68)).

11. In regard to claim 3, De Souza teaches;

- The method according to claim 1, wherein the specific relational

equation used at the substituting is an equation that can substitute the rows of the basic matrix created such that a weight in a column is placed at a top of the column.

(Note: De Souza, Abstract)

12. Claim 4 is rejected for the same reasons as claim 3.
13. In regard to claim 5, De Souza teaches;
 - The method according to claim 1, wherein, in the Gaussian approximation, an ensemble of optimum row weights and optimum column weights is searched at **one time based on a linear programming method in a state of a fixed coding rate**

However, De Souza does not teach the method of Gaussian approximation so as to maximize a Gaussian noise distribution.

The Applicant Admitted Prior Art (Note: AAPA, specifications page 5, lines (6-24)) teaches a linear programming to search an ensemble that minimizes a signal to noise ratio (SNR) i.e. to maximize a Gaussian noise distribution.
(Note: AAPA, specification, lines (17-19)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify De Souza with the teaching of AAPA to include details of Gaussian approximation in the heuristic search algorithm.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need to minimize a signal-to-noise ratio.

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14. Claim 6 is rejected for the same reasons as claim 5.

15. In regard to claim 7, De Souza teaches;

- The method according to claim 1, wherein, at the dividing, a Latin square of basic random sequence is generated, and a weight of "1" is extracted from each row and each column in the basic matrix after the row deletion, thereby dividing each column and each row at random based on the Latin square.

De Souza substantially teaches, in view of above rejections, (Note: De Souza, col. 8) the method and apparatus to maximize the rate given a fixed girth g and fixed length n , and fixed column weight distribution (a) . This is done by trying different values of m where g , n , and (a) are fixed. This may be done in a binary search mode by selecting the smallest m that achieves the desired length.

16. Claims 8-12 are rejected for the same reasons as claim 7.

17. Claim 13 is rejected for the same reasons as claim 1.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Matsumoto et al. (US publication no. 2004/0186992 A1) teaches LDPC code inspection matrix generation method.

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- Kuznetsov et al. (US paten no. 6757122 B1) teaches method and decoding apparatus using linear code with parity check matrices composed from circulants.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

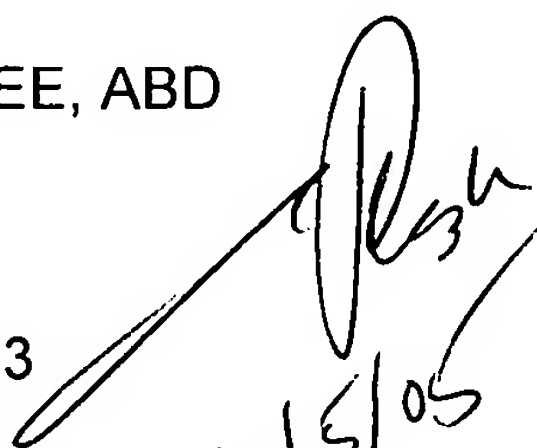
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free)

Sam Rizk, MSEE, ABD

Examiner

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10/5/05



JOSEPH TORRES
PRIMARY EXAMINER